

KILN UPGRADES WITH VARIABLE SPEED FANS

Ralph Ross
Columbia Harbor Lumber
Chahalis, WA

The data that will follow is the result of monitoring electric usage on a new, 12-zone, 88-foot Coe kiln. This kiln also has a variable speed fan control.

ESP is the name of BPA's energy savings program. This is an incentive program to promote electric power savings. P.C., of course, is personal computer and V.D. stands for variable drive.

The ESP plan has a rebate program for electric power savings. To be eligible for the rebate, you must document savings in electrical usage.

To clarify terms we are using, here are some definitions:

- 1) KWH - easy enough - kilowatt hour
- 2) Energy Charge - regular power rate
- 3) Peak Demand - the highest power demand during a billing month - (15 minute interval). (The basis of this is the power supplier has to be able to supply that amount to user.)

A short history of power rates will give you a picture of the rising costs of electric power, and how this can affect your drying costs.

Pre-1979	- Reg KWH rate	\$.004 per KWH
	- Peak Demand rate	1.25 per KWH
1980	- Reg KWH rate	.0075 per KWH
	- Peak Demand rate	1.85 per KWH
1991	- Reg KWH rate	.0217 per KWH
	- Peak Demand rate	4.50 per KWH

One other term we need to know about is Power Factor - this determines the penalty phase of your power bill. The penalty phase is based on a formula taking the usage below 95% of the peak usage, multiplying the measured demand by 95%, and dividing this amount by the actual power factor as determined by test or measurement.

In short, they have found a way to charge you for what you don't use. A typical recent bill -

KWH @ \$.0217	\$ 8,000.00
Penalty KW	<u>3,400.00</u>
Total	\$11,400.00

I asked for a show of hands for kiln operators that used computers for control. Fifteen of the 100 raised their hands. On a show of hands for variable speed fans about 8 raised their hands. On having 2-speed fans, 12-14 hands were lifted.

Some other testing on costs and methods are being conducted and some of the results are interesting. Some of the areas are:

- Reducing degrade through Vari-Drive control of fan speed.
- Reducing penalty KWH.

Variable speed drive can save you money on your power bill. Let me show you the tests results.

Bonneville Power Administration said we had to display savings. On a new installation, we had no data to compare, so we did this:

- 1) The local P.U.D. installed two meters right on the Vari-Drive lines. 1-KWH + 1 KVAR demand meter.
- 2) We ran similar charges testing at different fan speeds.

Test #1 Fans at 90% or 800 FPM - Energy use 14,600 KWH.

Test #2 Fans at 70% until EMC, then reduced to 50% or
445 FPM - Energy use 5,500 KWH.

@ \$.0217 KWH 14,600 = \$316.00

5,500 = 119.00

Savings 9,100 KW \$197.00

We projected our anticipated kiln production for 1991, projected the power usage, and came up with these numbers:

Fans at 90% 1,022,400.00 KWH

Fans as per test #2 391,500.00

 630,900.00 KWH savings

The dollar savings on this projection amounts to \$23,000. This is for 1 kiln, allowing 2 hour turn around on charges. We did the original tests and sent the data to the corporate controller who was dealing with the B.P.A. When he saw the results, he backed the figures off to seem more realistic. Bonneville did not believe the adjusted figures and hired the engineers from Washington State Energy Office to run new tests. They showed better savings than the first tests we ran.

I realize that every kiln is different and every charge dissimilar as to moisture content and drying rate. These figures are hard numbers for the tests. If we ran these same tests on different lumber, it would show different results, but would still illustrate a substantial savings rate.

There are some operators here that have been around more years than they want to admit. They have seen many fads and systems that have failed and have been through markets that were forgiving. Today we are in the most competitive and unforgiving market I have seen in nearly forty years of lumber experience. Because of this, the product we produce must be the best and most reasonably priced for us to be competitive. If we have a handle on our costs and a viable tool to help us do a better job, we are the winners. I have attended conventions like this since the early sixties. At each one I have picked up some hint or concept that has helped me. Multiply this by the one hundred operators that are here and if each of them finds a 1% improvement factor, think of the total return for the investment involved and the good done by the people who staff these and take care of the many details. The whole industry owes them a big thank you as do we.